

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Application No.: 10/811,204  
Filing Date: March 26, 2004  
Applicant: Daryl Chapman  
Group Art Unit: 1795  
Examiner: Ben Lewis  
Title: NON-FLAMMABLE EXHAUST ENABLER FOR  
HYDROGEN POWERED FUEL CELLS  
Attorney Docket: GP-302076

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Mail Stop - Appeals  
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**APPELLANT'S APPEAL BRIEF**

This is Appellant's Appeal Brief filed in accordance with 37 CFR § 41.37 appealing the Examiner's Final Office Action mailed July 18, 2008. Appellant's Notice of Appeal was filed September 26, 2008. The Appeal Brief fee is enclosed.

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**I. Real Party in Interest**

The real party in interest for this appeal is the General Motors Corporation of Detroit, Michigan, the assignee of this application.

**II. Related Appeals and Interferences**

There are no related appeals or interferences.

**III. Status of the Claims**

Claims 1, 5, 10 and 31 are pending. Claims 1, 5, 10 and 31 stand rejected. Claims 1, 5, 10 and 31 are on appeal. Claims 2-4, 6-9 and 11-30 have been cancelled. No claims have been objected to. No claim has been withdrawn from consideration. No claim has been allowed.

**IV. Status of Amendments**

All amendments have been entered.

**V. Summary of Claimed Subject Matter**

Independent claim 1 claims a fuel cell system, such as fuel cell system 10 shown in figure 1 and discussed beginning at paragraph [0015], page 4, line 22 of the specification. The claimed fuel cell system 10 includes a fuel cell stack 12 receiving a cathode input gas on cathode input line 18 and an anode input gas on anode input line 16, see paragraph [0015], page 4, line 22. The fuel cell stack 12 outputs a cathode exhaust gas on cathode exhaust gas line 22 and an anode exhaust gas on anode exhaust gas line 20, see paragraph [0015], page 4, line 22. The fuel cell system 10 also includes a purge valve 28 in the anode exhaust gas line 20 for selectively purging the anode exhaust gas, see paragraph [0017], page 5, lines 20-22. The fuel cell system 10

also includes an accumulator 26 coupled to the anode exhaust gas line 20 that accumulates the purged anode exhaust gas from the purge valve 28, also see paragraph [0017], page 5, lines 20-22. The fuel cell system 10 also includes a bleed valve 30 for selectively bleeding the anode exhaust gas accumulated in the accumulator 26 where the bled anode exhaust gas from the bleed valve 30 is combined with the cathode exhaust gas in the cathode exhaust gas line 22 at a mixer 32, see paragraph [0021], page 6, lines 29-31.

The bleed valve 30 can be at least one fixed orifice that allows the anode exhaust gas to be bled from the accumulator 26 in a continuous manner where the rate that the anode exhaust gas is bled from the accumulator 26 is less than the rate that the anode exhaust gas is purged into the accumulator 26 through the purge valve 28, see paragraph [0026], page 6, lines 12-28. By using the accumulator 26 and the bleed valve 30, the amount of hydrogen in the anode exhaust gas that is eventually bled to the environment can be maintained below the combustible level of hydrogen that otherwise may not occur by using the purge valve 28 alone, see paragraph 16, page 5, lines 5-14.

## **VI. Grounds of Rejection to be Reviewed on Appeal**

Whether claim 1 should be rejected under 35 USC 112, first paragraph, as failing to comply with the written description requirement;

Whether claims 1 and 5 should be rejected 35 US 103(a) as being unpatentable over JP 11-191422 to Hamada et al. (hereinafter Hamada) in view of U.S. Patent No. 6, 406,805 issued to James et al. (hereinafter James); and

Whether claim 10 should be rejected under 35 USC 103(a) as being unpatentable over Hamada in view of James and U.S. Patent No. 5,785,298 issued to Kumar (hereinafter Kumar).

## **VII. Argument**

### **A. Claim 1 complies with the written description requirement**

MPEP 2163.02 sets forth the standard for complying with the written description requirement of 35 USC §112, first paragraph. Particularly, the standard to comply with the written description requirement is, “[d]oes the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed.” Further, “[t]o satisfy the written description, an Applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention, and that the invention, in that context, is whatever is now claimed.”

As discussed in least paragraph [0017] of the specification, the system 10 employs the accumulator 26 to safely bleed the anode exhaust gas from the fuel cell stack 12 to non-combustible levels. Paragraph [0016] talks about purging the anode exhaust gas from the stack 12 at a rate that is greater than the combustion level of hydrogen in the anode exhaust gas, i.e., at a concentration level of hydrogen where it could ignite. Thus, it is clear from Appellant's specification that at least some purge levels of the anode exhaust gas through the purge valve 28 into the accumulator 26 is above the combustible level of hydrogen. Paragraph [0020] of the specification talks about the bleed valve 30 being a fixed orifice or orifices where the amount of the anode exhaust gas bled through the orifice from the accumulator 26 is continuous, but minimal. Paragraph [0020] further states various parameters of the system will determine the type and operation of the bleed valve 30, where the parameters are largely determined by how often it is necessary to purge the fuel cell stack 12. For vehicle applications, the purge rate of the fuel cell stack 12 will be determined by the power demands on the stack 12. Thus, paragraph [0016] talks about the purge rate of the anode exhaust gas through the purge valve 28 as at least sometimes being above the combustible level of

hydrogen and paragraph [0020] talks about the purge rate of the anode exhaust gas through the bleed valve 30 when it is a fixed orifice from the accumulator 26 as being below the combustible level of the hydrogen.

Appellant respectfully submits that one of ordinary skill in the art would readily recognize that Appellant invented and had in their possession as of the filing date of the application a fixed orifice bleed valve that bled anode exhaust gas from an accumulator in a continuous manner at a rate that was less than the rate that an anode exhaust gas was purged into the accumulator through a purge valve.

**B. Claims 1 and 5 are not obvious in view of Hamada and James**

**1. James**

James discloses a method for storing a purged anode gas from a fuel cell system 10. The fuel cell system 10 includes a three-way valve 26 that is controlled by a controller 24 for purging an anode exhaust gas from a fuel cell to a water removal device 28 and then to a hydrogen storage container 30. A vent valve 34 is controlled by the controller 24 to purge the anode gas from the container 30.

**2. Hamada**

Hamada discloses a fuel cell system including a fuel cell 10. A gas exhausting pipe 74 allows anode exhaust gas from the fuel cell 10 to be sent to a tank 54. A gas exhausting pipe 76 is connected to the tank 54 and to a mixer 78 through needle valves 80 and 82. Paragraph [0021] states that the needle valves 80 and 82 are electromagnetic valves.

**3. Discussion**

Independent claim 1 states that the bleed valve is at least one fixed orifice that

continuously bleeds the anode exhaust gas from the accumulator at a slower rate than the purge valve purges the anode exhaust gas into the accumulator. Support for this can be found in the specification in at least paragraph [0019] where it states that the contents of the accumulator 26 can be slowly removed through the bleed valve 30 before the next purge cycle, and paragraph [0020] where it states that the bleed valve 30 can be a fixed orifice where the amount of the anode exhaust gas bled through the orifice is continuous.

Appellant respectfully submits that James only discloses that the vent valve 34 is a controllable valve that is selectively opened and closed based on a signal from the controller 24. Therefore, it is clear that James does not teach or suggest that the vent valve 34 can be a fixed orifice that continuously allows the gas in the container 30 to be vented. Likewise, the needle valves 80 and 82 in Hamada are electromagnetically controlled valves for selectively controlling the flow of the gas from the tank 54 to the mixer 78, and are not fixed orifices that continuously allow a gas flow from the tank 54 to the mixer 78.

In response to Appellant's argument that the bleed valve is a fixed orifice valve that is continuously open and continuously allows bleeding from the accumulator, the Examiner has stated that the valve 80 in Hamada is a fixed orifice when it is opened, see page 5 of the final office action. The Examiner states that, "[s]ince the bleed valve (80) of Hamada et al. is capable of being opened and closed. Then it is capable of performing the functions as claimed by Applicant. (Examiner notes that when valve (80) of Hamada is open it forms a fixed orifice), see the final office action on page 8."

Appellant respectfully submits that this language in the final office action is an admission by the Examiner that Hamada does not teach a fixed orifice bleed valve. Clearly from Appellant's specification, claims and arguments, a fixed orifice bleed valve



is a bleed valve that has an orifice that is continuously and constantly the same size and is open. The needle valve 80 in Hamada is not fixed and is not continually opened, but changes in size and can be closed. Appellant does not follow the Examiner's reasoning that a valve whose opening can be changed is a fixed orifice valve. Does the Examiner think that a snapshot in time of a moving object means that the object is not moving? Appellant submits that a fixed orifice valve is a valve whose opening is always the same size, and such a valve is not taught or suggested by Hamada.

The Examiner further states that the language in independent claim 1 that the fixed orifice continually bleeds the anode exhaust gas from the accumulator at a slower rate than the purge valve purges the anode exhaust gas into the accumulator contains, "recitation with respect to the manner in which a claimed apparatus is intended to be employed [that] does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim," also see page 8 of the final Office Action. Appellant respectfully submits that claiming the bleed rate of the fixed orifice relative to the purge rate of the purge valve does add structure to the bleed valve because it defines the size of the fixed orifice relative to the purge valve, and thus, should be given patentable weight.

As discussed in paragraph [0020] of the specification, providing a fixed orifice valve may provide better results for a certain type of fuel cell system over a bleed valve that is selectively opened and closed. Applicant respectfully submits that because neither James nor Hamada teach or suggest that their valve at the output of the collection tank can be a fixed orifice valve, the combination of these two references does not make independent claim 1 obvious.

**C. Claim 10 is not obvious in view of James, Hamada and Kumar**

U.S. Patent No. 5,785,298 issued to Kumar discloses a proportional solenoid gas driven valve control assembly. It is believed that the Examiner is relying on Kumar to teach solenoid as controlled valves. As discussed above, the bleed valve is a fixed orifice valve and not a solenoid-control vale. Therefore, Appellant respectfully submits that Kumar cannot provide the teaching missing from James and Hamada to make Appellant's claimed invention obvious.

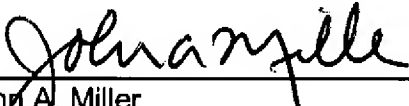
**VIII. Conclusion**

Appellant respectfully submits that claims 1, 5, 10 and 31 are not obvious in view of the combination of James, Hamada and Kumar and that claim 1 complies with the enablement requirement. It is therefore respectfully requested that the §112 and §103(a) rejections be reversed, and Appellants claims be allowed.

Respectfully submitted,

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**CLAIMS APPENDIX**

**COPY OF CLAIMS INVOLVED IN THE APPEAL**

1. A fuel cell system comprising:
  - a fuel cell stack, said fuel cell stack receiving a cathode input gas and a hydrogen anode input gas, said fuel cell stack exhausting a cathode exhaust gas on a cathode exhaust gas line and an anode exhaust gas on an anode exhaust gas line;
  - a purge valve coupled to the anode exhaust gas line for selectively purging the anode exhaust gas;
  - an accumulator coupled to the anode exhaust gas line, said accumulator accumulating the purged anode exhaust gas from the purge valve; and
  - a bleed valve for selectively bleeding the anode exhaust gas accumulated in the accumulator, wherein the bled anode exhaust gas from the bleed valve is combined with the cathode exhaust gas in the cathode exhaust gas line, said bleed valve being at least one fixed orifice that allows the anode exhaust gas to be bled from the accumulator in a continuous manner where the rate that the anode exhaust gas is bled from the accumulator is less than the rate that the anode exhaust gas is purged into the accumulator through the purge valve.
5. The system according to claim 1 wherein the combined anode and cathode exhaust gas is exhausted to the environment.
10. The system according to claim 1 wherein the purge valve is a spring-biased, solenoid controlled valve.
31. The system according to claim 1 wherein the at least one fixed orifice is a plurality of fixed orifices.

EVIDENCE APPENDIX

There is no evidence pursuant to §1.130, §1.131 or §1.132.

RELATED PROCEEDINGS APPENDIX

There are no decisions rendered by a court or the Board in any proceeding identified in Section II of this Appeal Brief.